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# SEQUENCE LISTING

<110> Aventis Behring GmbH

<120> Modified cDNA Factor VIII and its Derivatives

<130> 2002/M018-A66

<140> US/10/721,997

<141> 2003-11-26

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<170> PatentIn version 3.1

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Ala Thr Ala Pro Gly Ala Leu Pro Leu Gly Pro Ser Val Leu Tyr Lys  
35 40 45

Lys Thr Val Phe Val Glu Phe Thr Asp Gln Leu Phe Ser Val Ala Arg  
50 55 60

Pro Arg Pro Pro Trp Met Gly Leu Leu Gly Pro Thr Ile Gln Ala Glu  
65 70 75 80

Val Tyr Asp Thr Val Val Val Thr Leu Lys Asn Met Ala Ser His Pro  
85 90 95

Val Ser Leu His Ala Val Gly Val Ser Phe Trp Lys Ser Ser Glu Gly  
100 105 110

Ala Glu Tyr Glu Asp His Thr Ser Gln Arg Glu Lys Glu Asp Asp Lys  
115 120 125

Val Leu Pro Gly Lys Ser Gln Thr Tyr Val Trp Gln Val Leu Lys Glu  
130 135 140

Asn Gly Pro Thr Ala Ser Asp Pro Pro Cys Leu Thr Tyr Ser Tyr Leu  
145 150 155 160

Ser His Val Asp Leu Val Lys Asp Leu Asn Ser Gly Leu Ile Gly Ala  
165 170 175

Leu Leu Val Cys Arg Glu Gly Ser Leu Thr Arg Glu Arg Thr Gln Asn  
180 185 190

Leu His Glu Phe Val Leu Leu Phe Ala Val Phe Asp Glu Gly Lys Ser  
195 200 205

Trp His Ser Ala Arg Asn Asp Ser Trp Thr Arg Ala Met Asp Pro Ala  
210 215 220

Pro Ala Arg Ala Gln Pro Ala Met His Thr Val Asn Gly Tyr Val Asn  
225 230 235 240

Arg Ser Leu Pro Gly Leu Ile Gly Cys His Lys Lys Ser Val Tyr Trp  
245 250 255

His Val Ile Gly Met Gly Thr Ser Pro Glu Val His Ser Ile Phe Leu  
260 265 270

Glu Gly His Thr Phe Leu Val Arg His His Arg Gln Ala Ser Leu Glu  
275 280 285

Ile Ser Pro Leu Thr Phe Leu Thr Ala Gln Thr Phe Leu Met Asp Leu  
290 295 300

Gly Gln Phe Leu Leu Phe Cys His Ile Ser Ser His His His Gly Gly  
305 310 315 320

Met Glu Ala His Val Arg Val Glu Ser Cys Ala Glu Glu Pro Gln Leu  
325 330 335

Arg Arg Lys Ala Asp Glu Glu Glu Asp Tyr Asp Asp Asn Leu Tyr Asp  
340 345 350

Ser Asp Met Asp Val Val Arg Leu Asp Gly Asp Asp Val Ser Pro Phe  
355 360 365

Ile Gln Ile Arg Ser Val Ala Lys Lys His Pro Lys Thr Trp Val His  
370 375 380

Tyr Ile Ser Ala Glu Glu Glu Asp Trp Asp Tyr Ala Pro Ala Val Pro  
385 390 395 400

Ser Pro Ser Asp Arg Ser Tyr Lys Ser Leu Tyr Leu Asn Ser Gly Pro  
405 410 415

Gln Arg Ile Gly Arg Lys Tyr Lys Lys Ala Arg Phe Val Ala Tyr Thr  
420 425 430

Asp Val Thr Phe Lys Thr Arg Lys Ala Ile Pro Tyr Glu Ser Gly Ile  
435 440 445

Leu Gly Pro Leu Leu Tyr Gly Glu Val Gly Asp Thr Leu Leu Ile Ile  
450 455 460

Phe Lys Asn Lys Ala Ser Arg Pro Tyr Asn Ile Tyr Pro His Gly Ile  
465 470 475 480

Thr Asp Val Ser Ala Leu His Pro Gly Arg Leu Leu Lys Gly Trp Lys  
485 490 495

His Leu Lys Asp Met Pro Ile Leu Pro Gly Glu Thr Phe Lys Tyr Lys  
500 505 510

Trp Thr Val Thr Val Glu Asp Gly Pro Thr Lys Ser Asp Pro Arg Cys  
515 520 525

Leu Thr Arg Tyr Tyr Ser Ser Ser Ile Asn Leu Glu Lys Asp Leu Ala  
530 535 540

Ser Gly Leu Ile Gly Pro Leu Leu Ile Cys Tyr Lys Glu Ser Val Asp  
545 550 555 560

Gln Arg Gly Asn Gln Met Met Ser Asp Lys Arg Asn Val Ile Leu Phe  
565 570 575

Ser Val Phe Asp Glu Asn Gln Ser Trp Tyr Leu Ala Glu Asn Ile Gln  
580 585 590

Arg Phe Leu Pro Asn Pro Asp Gly Leu Gln Pro Gln Asp Pro Glu Phe  
595 600 605

Gln Ala Ser Asn Ile Met His Ser Ile Asn Gly Tyr Val Phe Asp Ser  
610 615 620

Leu Gln Leu Ser Val Cys Leu His Glu Val Ala Tyr Trp Tyr Ile Leu  
625 630 635 640

Ser Val Gly Ala Gln Thr Asp Phe Leu Ser Val Phe Phe Ser Gly Tyr  
645 650 655

Thr Phe Lys His Lys Met Val Tyr Glu Asp Thr Leu Thr Leu Phe Pro  
660 665 670

Phe Ser Gly Glu Thr Val Phe Met Ser Met Glu Asn Pro Gly Leu Trp  
675 680 685

Val Leu Gly Cys His Asn Ser Asp Leu Arg Asn Arg Gly Met Thr Ala  
690 695 700

Leu Leu Lys Val Tyr Ser Cys Asp Arg Asp Ile Gly Asp Tyr Tyr Asp  
705 710 715 720

Asn Thr Tyr Glu Asp Ile Pro Gly Phe Leu Leu Ser Gly Lys Asn Val  
725 730 735

Ile Glu Pro Arg Ser Phe Ala Gln Asn Ser Arg Pro Pro Ser Ala Ser  
740 745 750

Gln Lys Gln Phe Gln Thr Ile Thr Ser Pro Glu Asp Asp Val Glu Leu  
755 760 765

Asp Pro Gln Ser Gly Glu Arg Thr Gln Ala Leu Glu Glu Leu Ser Val  
770 775 780

Pro Ser Gly Asp Gly Ser Met Leu Leu Gly Gln Asn Pro Ala Pro His  
785 790 795 800

Gly Ser Ser Ser Ser Asp Leu Gln Glu Ala Arg Asn Glu Ala Asp Asp



805

810

815

Tyr Leu Pro Gly Ala Arg Glu Arg Asn Thr Ala Pro Ser Ala Ala Ala  
820 825 830

Arg Leu Arg Pro Glu Leu His His Ser Ala Glu Arg Val Leu Thr Pro  
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Glu Pro Glu Lys Glu Leu Lys Lys Leu Asp Ser Lys Met Ser Ser Ser  
850 855 860

Ser Asp Leu Leu Lys Thr Ser Pro Thr Ile Pro Ser Asp Thr Leu Ser  
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Ala Glu Thr Glu Arg Thr His Ser Leu Gly Pro Pro His Pro Gln Val  
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Asn Phe Arg Ser Gln Leu Gly Ala Ile Val Leu Gly Lys Asn Ser Ser  
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His Phe Ile Gly Ala Gly Val Pro Leu Gly Ser Thr Glu Glu Asp His  
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Glu Ser Ser Leu Gly Glu Asn Val Ser Pro Val Glu Ser Asp Gly Ile  
930 935 940

Phe Glu Lys Glu Arg Ala His Gly Pro Ala Ser Leu Thr Lys Asp Asp  
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Val Leu Phe Lys Val Asn Ile Ser Leu Val Lys Thr Asn Lys Ala Arg  
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Val Tyr Leu Lys Thr Asn Arg Lys Ile His Ile Asp Asp Ala Ala Leu  
980 985 990

Leu Thr Glu Asn Arg Ala Ser Ala Thr Phe Met Asp Lys Asn Thr Thr  
995 1000 1005

Ala Ser Gly Leu Asn His Val Ser Asn Trp Ile Lys Gly Pro Leu  
1010 1015 1020

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Lys	Gly	Lys	Glu	Met	Met	Leu	Pro	Asn	Ser	Glu	Leu	Thr	Phe	Leu
1070						1075					1080			
Thr	Asn	Ser	Ala	Asp	Val	Gln	Gly	Asn	Asp	Thr	His	Ser	Gln	Gly
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Lys	Lys	Ser	Arg	Glu	Glu	Met	Glu	Arg	Arg	Glu	Lys	Leu	Val	Gln
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Glu	Lys	Val	Asp	Leu	Pro	Gln	Val	Tyr	Thr	Ala	Thr	Gly	Thr	Lys
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Asn	Phe	Leu	Arg	Asn	Ile	Phe	His	Gln	Ser	Thr	Glu	Pro	Ser	Val
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Glu	Gly	Phe	Asp	Gly	Gly	Ser	His	Ala	Pro	Val	Pro	Gln	Asp	Ser
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Arg	Ser	Leu	Asn	Asp	Ser	Ala	Glu	Arg	Ala	Glu	Thr	His	Ile	Ala
1160						1165					1170			
His	Phe	Ser	Ala	Ile	Arg	Glu	Glu	Ala	Pro	Leu	Glu	Ala	Pro	Gly
1175						1180					1185			
Asn	Arg	Thr	Gly	Pro	Gly	Pro	Arg	Ser	Ala	Val	Pro	Arg	Arg	Val
1190						1195					1200			
Lys	Gln	Ser	Leu	Lys	Gln	Ile	Arg	Leu	Pro	Leu	Glu	Glu	Ile	Lys
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Pro	Glu	Arg	Gly	Val	Val	Leu	Asn	Ala	Thr	Ser	Thr	Arg	Trp	Ser
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Leu Pro Phe Leu Thr Leu Glu Met Ala Gly Gly Gln Gly Lys Ile  
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Ser Ala Leu Gly Lys Ser Ala Ala Gly Pro Leu Ala Ser Gly Lys  
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Leu Glu Lys Ala Val Leu Ser Ser Ala Gly Leu Ser Glu Ala Ser  
1280 1285 1290

Gly Lys Ala Glu Phe Leu Pro Lys Val Arg Val His Arg Glu Asp  
1295 1300 1305

Leu Leu Pro Gln Lys Thr Ser Asn Val Ser Cys Ala His Gly Asp  
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Gly Pro Pro Met Pro Lys Glu Trp Glu Ser Leu Glu Lys Ser Pro  
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Lys Ser Thr Ala Leu Arg Thr Lys Asp Ile Ile Ser Leu Pro Leu  
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Asp Arg His Glu Ser Asn His Ser Ile Ala Ala Lys Asn Glu Gly  
1385 1390 1395

Gln Ala Glu Thr Gln Arg Glu Ala Ala Trp Thr Lys Gln Gly Gly  
1400 1405 1410

Pro Gly Arg Leu Cys Ala Pro Lys Pro Pro Val Leu Arg Arg His  
1415 1420 1425

Gln Arg Asp Ile Ser Leu Pro Thr Phe Gln Pro Glu Glu Asp Lys  
1430 1435 1440

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Gln	Lys	Arg	Thr	Arg	His	Tyr	Phe	Ile	Ala	Ala	Val	Glu	Gln	Leu
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Lys Ser Trp Tyr Phe Thr Glu Asn Val Glu Arg Asn Cys Arg Ala 1670 1675 1680		
Pro Cys His Leu Gln Met Glu Asp Pro Thr Leu Lys Glu Asn Tyr 1685 1690 1695		
Arg Phe His Ala Ile Asn Gly Tyr Val Met Asp Thr Leu Pro Gly 1700 1705 1710		
Leu Val Met Ala Gln Asn Gln Arg Ile Arg Trp Tyr Leu Leu Ser 1715 1720 1725		
Met Gly Ser Asn Glu Asn Ile His Ser Ile His Phe Ser Gly His 1730 1735 1740		
Val Phe Ser Val Arg Lys Lys Glu Glu Tyr Lys Met Ala Val Tyr 1745 1750 1755		
Asn Leu Tyr Pro Gly Val Phe Glu Thr Val Glu Met Leu Pro Ser 1760 1765 1770		
Lys Val Gly Ile Trp Arg Ile Glu Cys Leu Ile Gly Glu His Leu 1775 1780 1785		
Gln Ala Gly Met Ser Thr Thr Phe Leu Val Tyr Ser Lys Glu Cys 1790 1795 1800		
Gln Ala Pro Leu Gly Met Ala Ser Gly Arg Ile Arg Asp Phe Gln 1805 1810 1815		
Ile Thr Ala Ser Gly Gln Tyr Gly Gln Trp Ala Pro Lys Leu Ala 1820 1825 1830		
Arg Leu His Tyr Ser Gly Ser Ile Asn Ala Trp Ser Thr Lys Asp 1835 1840 1845		

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Pro	Pro	Ile	Val	Ala	Arg	Tyr	Ile	Arg	Leu	His	Pro	Thr	His	Tyr
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Ser	Ile	Arg	Ser	Thr	Leu	Arg	Met	Glu	Leu	Met	Gly	Cys	Asp	Leu
1940						1945					1950			
Asn	Ser	Cys	Ser	Met	Pro	Leu	Gly	Met	Gln	Asn	Lys	Ala	Ile	Ser
1955						1960					1965			
Asp	Ser	Gln	Ile	Thr	Ala	Ser	Ser	His	Leu	Ser	Asn	Ile	Phe	Ala
1970						1975					1980			
Thr	Trp	Ser	Pro	Ser	Gln	Ala	Arg	Leu	His	Leu	Gln	Gly	Arg	Thr
1985						1990					1995			
Asn	Ala	Trp	Arg	Pro	Arg	Val	Ser	Ser	Ala	Glu	Glu	Trp	Leu	Gln
2000						2005					2010			
Val	Asp	Leu	Gln	Lys	Thr	Val	Lys	Val	Thr	Gly	Ile	Thr	Thr	Gln
2015						2020					2025			
Gly	Val	Lys	Ser	Leu	Leu	Ser	Ser	Met	Tyr	Val	Lys	Glu	Phe	Leu
2030						2035					2040			
Val	Ser	Ser	Ser	Gln	Asp	Gly	Arg	Arg	Trp	Thr	Leu	Phe	Leu	Gln
2045						2050					2055			

Asp Gly His Thr Lys Val Phe Gln Gly Asn Gln Asp Ser Ser Thr  
2060 2065 2070

Pro Val Val Asn Ala Leu Asp Pro Pro Leu Phe Thr Arg Tyr Leu  
2075 2080 2085

Arg Ile His Pro Thr Ser Trp Ala Gln His Ile Ala Leu Arg Leu  
2090 2095 2100

Glu Val Leu Gly Cys Glu Ala Gln Asp Leu Tyr  
2105 2110

<210> 34

<211> 2332

<212> PRT

<213> Homo sapiens

<400> 34

Ala Thr Arg Arg Tyr Tyr Leu Gly Ala Val Glu Leu Ser Trp Asp Tyr  
1 5 10 15

Met Gln Ser Asp Leu Gly Glu Leu Pro Val Asp Ala Arg Phe Pro Pro  
20 25 30

Arg Val Pro Lys Ser Phe Pro Phe Asn Thr Ser Val Val Tyr Lys Lys  
35 40 45

Thr Leu Phe Val Glu Phe Thr Asp His Leu Phe Asn Ile Ala Lys Pro  
50 55 60

Arg Pro Pro Trp Met Gly Leu Leu Gly Pro Thr Ile Gln Ala Glu Val  
65 70 75 80

Tyr Asp Thr Val Val Ile Thr Leu Lys Asn Met Ala Ser His Pro Val  
85 90 95

Ser Leu His Ala Val Gly Val Ser Tyr Trp Lys Ala Ser Glu Gly Ala  
100 105 110

Glu Tyr Asp Asp Gln Thr Ser Gln Arg Glu Lys Glu Asp Asp Lys Val  
115 120 125

Phe Pro Gly Gly Ser His Thr Tyr Val Trp Gln Val Leu Lys Glu Asn  
130 135 140

Gly Pro Met Ala Ser Asp Pro Leu Cys Leu Thr Tyr Ser Tyr Leu Ser  
145 150 155 160

His Val Asp Leu Val Lys Asp Leu Asn Ser Gly Leu Ile Gly Ala Leu  
165 170 175

Leu Val Cys Arg Glu Gly Ser Leu Ala Lys Glu Lys Thr Gln Thr Leu  
180 185 190

His Lys Phe Ile Leu Leu Phe Ala Val Phe Asp Glu Gly Lys Ser Trp  
195 200 205

His Ser Glu Thr Lys Asn Ser Leu Met Gln Asp Arg Asp Ala Ala Ser  
210 215 220

Ala Arg Ala Trp Pro Lys Met His Thr Val Asn Gly Tyr Val Asn Arg  
225 230 235 240

Ser Leu Pro Gly Leu Ile Gly Cys His Arg Lys Ser Val Tyr Trp His  
245 250 255

Val Ile Gly Met Gly Thr Thr Pro Glu Val His Ser Ile Phe Leu Glu  
260 265 270

Gly His Thr Phe Leu Val Arg Asn His Arg Gln Ala Ser Leu Glu Ile  
275 280 285

Ser Pro Ile Thr Phe Leu Thr Ala Gln Thr Leu Leu Met Asp Leu Gly  
290 295 300

Gln Phe Leu Leu Phe Cys His Ile Ser Ser His Gln His Asp Gly Met  
305 310 315 320

Glu Ala Tyr Val Lys Val Asp Ser Cys Pro Glu Glu Pro Gln Leu Arg  
325 330 335

Met Lys Asn Asn Glu Glu Ala Glu Asp Tyr Asp Asp Asp Leu Thr Asp  
340 345 350



Ser Glu Met Asp Val Val Arg Phe Asp Asp Asp Asn Ser Pro Ser Phe  
355 360 365

Ile Gln Ile Arg Ser Val Ala Lys Lys His Pro Lys Thr Trp Val His  
370 375 380

Tyr Ile Ala Ala Glu Glu Glu Asp Trp Asp Tyr Ala Pro Leu Val Leu  
385 390 395 400

Ala Pro Asp Asp Arg Ser Tyr Lys Ser Gln Tyr Leu Asn Asn Gly Pro  
405 410 415

Gln Arg Ile Gly Arg Lys Tyr Lys Lys Val Arg Phe Met Ala Tyr Thr  
420 425 430

Asp Glu Thr Phe Lys Thr Arg Glu Ala Ile Gln His Glu Ser Gly Ile  
435 440 445

Leu Gly Pro Leu Leu Tyr Gly Glu Val Gly Asp Thr Leu Leu Ile Ile  
450 455 460

Phe Lys Asn Gln Ala Ser Arg Pro Tyr Asn Ile Tyr Pro His Gly Ile  
465 470 475 480

Thr Asp Val Arg Pro Leu Tyr Ser Arg Arg Leu Pro Lys Gly Val Lys  
485 490 495

His Leu Lys Asp Phe Pro Ile Leu Pro Gly Glu Ile Phe Lys Tyr Lys  
500 505 510

Trp Thr Val Thr Val Glu Asp Gly Pro Thr Lys Ser Asp Pro Arg Cys  
515 520 525

Leu Thr Arg Tyr Tyr Ser Ser Phe Val Asn Met Glu Arg Asp Leu Ala  
530 535 540

Ser Gly Leu Ile Gly Pro Leu Leu Ile Cys Tyr Lys Glu Ser Val Asp  
545 550 555 560

Gln Arg Gly Asn Gln Ile Met Ser Asp Lys Arg Asn Val Ile Leu Phe

565	570	575
Ser Val Phe Asp Glu Asn Arg Ser Trp Tyr Leu Thr Glu Asn Ile Gln 580 585 590		
Arg Phe Leu Pro Asn Pro Ala Gly Val Gln Leu Glu Asp Pro Glu Phe 595 600 605		
Gln Ala Ser Asn Ile Met His Ser Ile Asn Gly Tyr Val Phe Asp Ser 610 615 620		
Leu Gln Leu Ser Val Cys Leu His Glu Val Ala Tyr Trp Tyr Ile Leu 625 630 635 640		
Ser Ile Gly Ala Gln Thr Asp Phe Leu Ser Val Phe Phe Ser Gly Tyr 645 650 655		
Thr Phe Lys His Lys Met Val Tyr Glu Asp Thr Leu Thr Leu Phe Pro 660 665 670		
Phe Ser Gly Glu Thr Val Phe Met Ser Met Glu Asn Pro Gly Leu Trp 675 680 685		
Ile Leu Gly Cys His Asn Ser Asp Phe Arg Asn Arg Gly Met Thr Ala 690 695 700		
Leu Leu Lys Val Ser Ser Cys Asp Lys Asn Thr Gly Asp Tyr Tyr Glu 705 710 715 720		
Asp Ser Tyr Glu Asp Ile Ser Ala Tyr Leu Leu Ser Lys Asn Asn Ala 725 730 735		
Ile Glu Pro Arg Ser Phe Ser Gln Asn Ser Arg His Arg Ser Thr Arg 740 745 750		
Gln Lys Gln Phe Asn Ala Thr Thr Ile Pro Glu Asn Asp Ile Glu Lys 755 760 765		
Thr Asp Pro Trp Phe Ala His Arg Thr Pro Met Pro Lys Ile Gln Asn 770 775 780		

Val Ser Ser Ser Asp Leu Leu Met Leu Leu Arg Gln Ser Pro Thr Pro  
785 790 795 800

His Gly Leu Ser Leu Ser Asp Leu Gln Glu Ala Lys Tyr Glu Thr Phe  
805 810 815

Ser Asp Asp Pro Ser Pro Gly Ala Ile Asp Ser Asn Asn Ser Leu Ser  
820 825 830

Glu Met Thr His Phe Arg Pro Gln Leu His His Ser Gly Asp Met Val  
835 840 845

Phe Thr Pro Glu Ser Gly Leu Gln Leu Arg Leu Asn Glu Lys Leu Gly  
850 855 860

Thr Thr Ala Ala Thr Glu Leu Lys Lys Leu Asp Phe Lys Val Ser Ser  
865 870 875 880

Thr Ser Asn Asn Leu Ile Ser Thr Ile Pro Ser Asp Asn Leu Ala Ala  
885 890 895

Gly Thr Asp Asn Thr Ser Ser Leu Gly Pro Pro Ser Met Pro Val His  
900 905 910

Tyr Asp Ser Gln Leu Asp Thr Thr Leu Phe Gly Lys Lys Ser Ser Pro  
915 920 925

Leu Thr Glu Ser Gly Gly Pro Leu Ser Leu Ser Glu Glu Asn Asn Asp  
930 935 940

Ser Lys Leu Leu Glu Ser Gly Leu Met Asn Ser Gln Glu Ser Ser Trp  
945 950 955 960

Gly Lys Asn Val Ser Ser Thr Glu Ser Gly Arg Leu Phe Lys Gly Lys  
965 970 975

Arg Ala His Gly Pro Ala Leu Leu Thr Lys Asp Asn Ala Leu Phe Lys  
980 985 990

Val Ser Ile Ser Leu Leu Lys Thr Asn Lys Thr Ser Asn Asn Ser Ala  
995 1000 1005

Thr	Asn	Arg	Lys	Thr	His	Ile	Asp	Gly	Pro	Ser	Leu	Leu	Ile	Glu
1010						1015					1020			
Asn	Ser	Pro	Ser	Val	Trp	Gln	Asn	Ile	Leu	Glu	Ser	Asp	Thr	Glu
1025						1030					1035			
Phe	Lys	Lys	Val	Thr	Pro	Leu	Ile	His	Asp	Arg	Met	Leu	Met	Asp
1040						1045					1050			
Lys	Asn	Ala	Thr	Ala	Leu	Arg	Leu	Asn	His	Met	Ser	Asn	Lys	Thr
1055						1060					1065			
Thr	Ser	Ser	Lys	Asn	Met	Glu	Met	Val	Gln	Gln	Lys	Lys	Glu	Gly
1070						1075					1080			
Pro	Ile	Pro	Pro	Asp	Ala	Gln	Asn	Pro	Asp	Met	Ser	Phe	Phe	Lys
1085						1090					1095			
Met	Leu	Phe	Leu	Pro	Glu	Ser	Ala	Arg	Trp	Ile	Gln	Arg	Thr	His
1100						1105					1110			
Gly	Lys	Asn	Ser	Leu	Asn	Ser	Gly	Gln	Gly	Pro	Ser	Pro	Lys	Gln
1115						1120					1125			
Leu	Val	Ser	Leu	Gly	Pro	Glu	Lys	Ser	Val	Glu	Gly	Gln	Asn	Phe
1130						1135					1140			
Leu	Ser	Glu	Lys	Asn	Lys	Val	Val	Val	Gly	Lys	Gly	Glu	Phe	Thr
1145						1150					1155			
Lys	Asp	Val	Gly	Leu	Lys	Glu	Met	Val	Phe	Pro	Ser	Ser	Arg	Asn
1160						1165					1170			
Leu	Phe	Leu	Thr	Asn	Leu	Asp	Asn	Leu	His	Glu	Asn	Asn	Thr	His
1175						1180					1185			
Asn	Gln	Glu	Lys	Lys	Ile	Gln	Glu	Glu	Ile	Glu	Lys	Lys	Glu	Thr
1190						1195					1200			
Leu	Ile	Gln	Glu	Asn	Val	Val	Leu	Pro	Gln	Ile	His	Thr	Val	Thr
1205						1210					1215			

Gly	Thr	Lys	Asn	Phe	Met	Lys	Asn	Leu	Phe	Leu	Leu	Ser	Thr	Arg
1220						1225					1230			
Gln	Asn	Val	Glu	Gly	Ser	Tyr	Asp	Gly	Ala	Tyr	Ala	Pro	Val	Leu
1235						1240					1245			
Gln	Asp	Phe	Arg	Ser	Leu	Asn	Asp	Ser	Thr	Asn	Arg	Thr	Lys	Lys
1250						1255					1260			
His	Thr	Ala	His	Phe	Ser	Lys	Lys	Gly	Glu	Glu	Glu	Asn	Leu	Glu
1265						1270					1275			
Gly	Leu	Gly	Asn	Gln	Thr	Lys	Gln	Ile	Val	Glu	Lys	Tyr	Ala	Cys
1280						1285					1290			
Thr	Thr	Arg	Ile	Ser	Pro	Asn	Thr	Ser	Gln	Gln	Asn	Phe	Val	Thr
1295						1300					1305			
Gln	Arg	Ser	Lys	Arg	Ala	Leu	Lys	Gln	Phe	Arg	Leu	Pro	Leu	Glu
1310						1315					1320			
Glu	Thr	Glu	Leu	Glu	Lys	Arg	Ile	Ile	Val	Asp	Asp	Thr	Ser	Thr
1325						1330					1335			
Gln	Trp	Ser	Lys	Asn	Met	Lys	His	Leu	Thr	Pro	Ser	Thr	Leu	Thr
1340						1345					1350			
Gln	Ile	Asp	Tyr	Asn	Glu	Lys	Glu	Lys	Gly	Ala	Ile	Thr	Gln	Ser
1355						1360					1365			
Pro	Leu	Ser	Asp	Cys	Leu	Thr	Arg	Ser	His	Ser	Ile	Pro	Gln	Ala
1370						1375					1380			
Asn	Arg	Ser	Pro	Leu	Pro	Ile	Ala	Lys	Val	Ser	Ser	Phe	Pro	Ser
1385						1390					1395			
Ile	Arg	Pro	Ile	Tyr	Leu	Thr	Arg	Val	Leu	Phe	Gln	Asp	Asn	Ser
1400						1405					1410			
Ser	His	Leu	Pro	Ala	Ala	Ser	Tyr	Arg	Lys	Lys	Asp	Ser	Gly	Val

1415	1420	1425
Gln Glu Ser Ser His Phe Leu Gln Gly Ala Lys Lys Asn Asn Leu		
1430	1435	1440
Ser Leu Ala Ile Leu Thr Leu Glu Met Thr Gly Asp Gln Arg Glu		
1445	1450	1455
Val Gly Ser Leu Gly Thr Ser Ala Thr Asn Ser Val Thr Tyr Lys		
1460	1465	1470
Lys Val Glu Asn Thr Val Leu Pro Lys Pro Asp Leu Pro Lys Thr		
1475	1480	1485
Ser Gly Lys Val Glu Leu Leu Pro Lys Val His Ile Tyr Gln Lys		
1490	1495	1500
Asp Leu Phe Pro Thr Glu Thr Ser Asn Gly Ser Pro Gly His Leu		
1505	1510	1515
Asp Leu Val Glu Gly Ser Leu Leu Gln Gly Thr Glu Gly Ala Ile		
1520	1525	1530
Lys Trp Asn Glu Ala Asn Arg Pro Gly Lys Val Pro Phe Leu Arg		
1535	1540	1545
Val Ala Thr Glu Ser Ser Ala Lys Thr Pro Ser Lys Leu Leu Asp		
1550	1555	1560
Pro Leu Ala Trp Asp Asn His Tyr Gly Thr Gln Ile Pro Lys Glu		
1565	1570	1575
Glu Trp Lys Ser Gln Glu Lys Ser Pro Glu Lys Thr Ala Phe Lys		
1580	1585	1590
Lys Lys Asp Thr Ile Leu Ser Leu Asn Ala Cys Glu Ser Asn His		
1595	1600	1605
Ala Ile Ala Ala Ile Asn Glu Gly Gln Asn Lys Pro Glu Ile Glu		
1610	1615	1620

Val Thr Trp Ala Lys Gln Gly Arg Thr Glu Arg Leu Cys Ser Gln  
1625 1630 1635

Asn Pro Pro Val Leu Lys Arg His Gln Arg Glu Ile Thr Arg Thr  
1640 1645 1650

Thr Leu Gln Ser Asp Gln Glu Glu Ile Asp Tyr Asp Asp Thr Ile  
1655 1660 1665

Ser Val Glu Met Lys Lys Glu Asp Phe Asp Ile Tyr Asp Glu Asp  
1670 1675 1680

Glu Asn Gln Ser Pro Arg Ser Phe Gln Lys Lys Thr Arg His Tyr  
1685 1690 1695

Phe Ile Ala Ala Val Glu Arg Leu Trp Asp Tyr Gly Met Ser Ser  
1700 1705 1710

Ser Pro His Val Leu Arg Asn Arg Ala Gln Ser Gly Ser Val Pro  
1715 1720 1725

Gln Phe Lys Lys Val Val Phe Gln Glu Phe Thr Asp Gly Ser Phe  
1730 1735 1740

Thr Gln Pro Leu Tyr Arg Gly Glu Leu Asn Glu His Leu Gly Leu  
1745 1750 1755

Leu Gly Pro Tyr Ile Arg Ala Glu Val Glu Asp Asn Ile Met Val  
1760 1765 1770

Thr Phe Arg Asn Gln Ala Ser Arg Pro Tyr Ser Phe Tyr Ser Ser  
1775 1780 1785

Leu Ile Ser Tyr Glu Glu Asp Gln Arg Gln Gly Ala Glu Pro Arg  
1790 1795 1800

Lys Asn Phe Val Lys Pro Asn Glu Thr Lys Thr Tyr Phe Trp Lys  
1805 1810 1815

Val Gln His His Met Ala Pro Thr Lys Asp Glu Phe Asp Cys Lys  
1820 1825 1830

Ala Trp	Ala Tyr Phe Ser Asp	Val Asp Leu Glu Lys	Asp Val His
1835	1840	1845	
Ser Gly	Leu Ile Gly Pro Leu	Leu Val Cys His Thr	Asn Thr Leu
1850	1855	1860	
Asn Pro	Ala His Gly Arg Gln	Val Thr Val Gln Glu	Phe Ala Leu
1865	1870	1875	
Phe Phe	Thr Ile Phe Asp Glu	Thr Lys Ser Trp Tyr	Phe Thr Glu
1880	1885	1890	
Asn Met	Glu Arg Asn Cys Arg	Ala Pro Cys Asn Ile	Gln Met Glu
1895	1900	1905	
Asp Pro	Thr Phe Lys Glu Asn	Tyr Arg Phe His Ala	Ile Asn Gly
1910	1915	1920	
Tyr Ile	Met Asp Thr Leu Pro	Gly Leu Val Met Ala	Gln Asp Gln
1925	1930	1935	
Arg Ile	Arg Trp Tyr Leu Leu	Ser Met Gly Ser Asn	Glu Asn Ile
1940	1945	1950	
His Ser	Ile His Phe Ser Gly	His Val Phe Thr Val	Arg Lys Lys
1955	1960	1965	
Glu Glu	Tyr Lys Met Ala Leu	Tyr Asn Leu Tyr Pro	Gly Val Phe
1970	1975	1980	
Glu Thr	Val Glu Met Leu Pro	Ser Lys Ala Gly Ile	Trp Arg Val
1985	1990	1995	
Glu Cys	Leu Ile Gly Glu His	Leu His Ala Gly Met	Ser Thr Leu
2000	2005	2010	
Phe Leu	Val Tyr Ser Asn Lys	Cys Gln Thr Pro Leu	Gly Met Ala
2015	2020	2025	
Ser Gly	His Ile Arg Asp Phe	Gln Ile Thr Ala Ser	Gly Gln Tyr
2030	2035	2040	



Gly Gln Trp Ala Pro Lys Leu Ala Arg Leu His Tyr Ser Gly Ser  
2045 2050 2055

Ile Asn Ala Trp Ser Thr Lys Glu Pro Phe Ser Trp Ile Lys Val  
2060 2065 2070

Asp Leu Leu Ala Pro Met Ile Ile His Gly Ile Lys Thr Gln Gly  
2075 2080 2085

Ala Arg Gln Lys Phe Ser Ser Leu Tyr Ile Ser Gln Phe Ile Ile  
2090 2095 2100

Met Tyr Ser Leu Asp Gly Lys Lys Trp Gln Thr Tyr Arg Gly Asn  
2105 2110 2115

Ser Thr Gly Thr Leu Met Val Phe Phe Gly Asn Val Asp Ser Ser  
2120 2125 2130

Gly Ile Lys His Asn Ile Phe Asn Pro Pro Ile Ile Ala Arg Tyr  
2135 2140 2145

Ile Arg Leu His Pro Thr His Tyr Ser Ile Arg Ser Thr Leu Arg  
2150 2155 2160

Met Glu Leu Met Gly Cys Asp Leu Asn Ser Cys Ser Met Pro Leu  
2165 2170 2175

Gly Met Glu Ser Lys Ala Ile Ser Asp Ala Gln Ile Thr Ala Ser  
2180 2185 2190

Ser Tyr Phe Thr Asn Met Phe Ala Thr Trp Ser Pro Ser Lys Ala  
2195 2200 2205

Arg Leu His Leu Gln Gly Arg Ser Asn Ala Trp Arg Pro Gln Val  
2210 2215 2220

Asn Asn Pro Lys Glu Trp Leu Gln Val Asp Phe Gln Lys Thr Met  
2225 2230 2235

Lys Val Thr Gly Val Thr Thr Gln Gly Val Lys Ser Leu Leu Thr

2240

2245

2250

Ser Met Tyr Val Lys Glu Phe Leu Ile Ser Ser Ser Gln Asp Gly  
2255 2260 2265

His Gln Trp Thr Leu Phe Phe Gln Asn Gly Lys Val Lys Val Phe  
2270 2275 2280

Gln Gly Asn Gln Asp Ser Phe Thr Pro Val Val Asn Ser Leu Asp  
2285 2290 2295

Pro Pro Leu Leu Thr Arg Tyr Leu Arg Ile His Pro Gln Ser Trp  
2300 2305 2310

Val His Gln Ile Ala Leu Arg Met Glu Val Leu Gly Cys Glu Ala  
2315 2320 2325

Gln Asp Leu Tyr  
2330